TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

April 5, 1985

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority) 50-391

During a March 28, 1985 meeting between TVA and NRC representatives, the NRC representatives indicated that there were several questions regarding TVA's February 19, 1985 submittal to NRC concerning environmental qualification of equipment subject to a main steam line break (MSLB) outside containment at the Watts Bar Nuclear Plant. Additional questions were also relayed to TVA on April 1, 1985. The responses to the questions were then discussed in an April 2, 1985 conference call held between TVA and NRC representatives. Enclosed is our response to those concerns.

If you have any questions concerning this matter, please get in touch with K. Mali of my staff at FTS 858-2682.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Domer
Nuclear Engineer

Sworn to and subscribed before me
this 5th day of April 1985

Paulette H. White
Notary Public
My Commission Expires 8-24-88

Enclosure
cc: U.S. Nuclear Regulatory Commisson (Enclosure)
Region II
Attn: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

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ENCLOSURE
RESPONSES TO NRC-NRR AUXILIARY SYSTEMS BRANCH QUESTIONS

(Reference: TVA's letter to NRC dated February 19, 1985,
Enevironmental Qualification Statement,
WBN-MEB-3-0111, Appendix 7)

Question 1 - Page 16 of Appendix 7, Time Temperature Profile

What is the exact time at which the temperature exceeds the equipment qualification limit?

Response

The temperature in the valve vault room will exceed the equipment qualification limit at 170 seconds for the temperature profile submitted.

Question 2

Provide the smallest time margin from the time equipment completes its safety function to the time the temperature exceeds the equipment's qualification limit.

Response

Watts Bar Nuclear Plant (WBN) specific time intervals between safety signal initiation and the start of steam generator tube uncovery are not available at this time. The TVA safety evaluation referenced was based on Catawba analyses performed by Westinghouse and discussions with Westinghouse as to how the reactor would respond and what types of trips would occur for various break sizes and power levels. TVA has expedited obtaining WBN-specific information for this event by contracting on an as soon as possible basis with Westinghouse (versus joining the Westinghouse Owners Group on this issue which is scheduled to produce results in late fall 1985). We expect to receive this analysis in mid-April. (Note: This work followed similar Westinghouse work on Catawba and, therefore, could not be done earlier.) TVA has committed to provide final WBN plant-specific analyses by June 14, 1985.

Question 3

TVA used 0.86 ft^2 break as worst break. Provide justification for using that break size and for referencing Catawba (i.e., same steam generator, core size, etc.).

Response

Based upon the Catawba data available at the time of the safety evaluation, the 0.86 ft^2 break produced environmental conditions more severe than other size breaks due to the combination of the onset time and duration of the superheated blowdown. The Catawba data is applicable to WBN since both plants are similar with the same size core and same model steam generator. In addition, neither plant proposes to use a boron injection tank to mitigate the main steam line break (MSLB).

Question 4 - Page 9, Item 10, Main Feedwater (MFW) Isolation Valves

TVA says these motor-operated valves (MOV) will fail "as-is" and not reopen. Address the possibility of the motor shorting out and opening up the valve.

Response

The MFW isolation valves have 480V motor operators. There is no failure mode in the motor that could cause the motor to short and reopen. The MFW isolation signal that closes the MFW isolation valves also closes the regulator valve and terminates operation of the MFW pumps. Therefore, if the MFW isolation valves were to reopen, MFW isolation is maintained by the components outside of the valve vault (in the mild environment).

Question 5 - Page 10, Item 13, Steam Generator Level Control Valve (LCV) Positioners.

TVA states the operator has adequate time to detect overfilling of the steam generator. How much time does the operator have?

Response

For purposes of determining the time to overfill a steam generator, it was assumed all flow from the turbine-driven auxiliary feedwater (AFW) pump is going to the steam generator with the open LCV; no flow is available from the motor-driven AFW pumps since the LCVs are not in the valve vault; and no flow out of the steam generator was assumed to minimize the filling time. Based on these assumptions, the operator has approximately 17 to 18 minutes after the high-high level alarm occurs to take corrective action before the steam generator overfills.

Question 6

For local handswitches on MFW isolation valves, TVA made a statement that no failure mode will cause these valves to reopen. Justify this statement.

Response

The open contact on the local handswitches are isolated from the control circuit on a feedwater isolation signal. There is a relay contact between the switch open contact and the valve, opening the circuit. This relay is located in 480V reactor MOV board 1A2 which is not in the harsh environment (valve vault) and opens on a feedwater isolation signal, thus preventing the local handswitch from opening the valve. Therefore, the switch can fail in any position and not affect the MFW isolation valve after a MFW isolation signal.

Question 7 - Page 12, item 7.

TVA says it is impossible for a cable failure to degrade or reverse a completed safety function. Justify this statement.

Response

After the safety function is performed (i.e., motor-operated valve closed or solenoid valve deenergized), most cables are not energized so cable shorts will not create a problem. The valves that do have cables that remain energized either are not needed to mitigate the MSLB, or have a redundant component outside the valve vault which would prevent degradation of a safety function.

Question 8 - Page 13, item 9, Main Steam Isolation Valves (MSIVs).

TVA says if these valves fail open the consequences would be the same as item 3. Since item 3 is true for very small break sizes, why is it also true for large breaks?

Response

Item 3 on page 6 addresses larger breaks. Large breaks generate MSIV closure signals so the MSIV solenoids and valves will have operated before generation of significant superheat. This safety evaluation assumes that if a break size does not generate MSIV closure, then the flow is choked. Our evaluation of the solenoids and the MSIV is consistent.

Questions 9 and 10 - Item 21, page 13, MFW Upper Tap Isolation Valve, and Item 22, page 14, MFW Check Valve Bypass Valve (respectively).

TVA states that these valves will be closed before superheated steam will be generated.

a. Give the time for each valve to close and the time of exceeding qualification temperatures.

b. Give assurance that valve closure is automatic and, if not, the operator time.

Response

a. The upper tap MFW isolation valve closes in 6.5 seconds after the signal to close is received. The MFW check valve bypass closes in 6.5 seconds after the signal to close is received. The time for event initiation to feedwater isolation is not available at this time. See our response to question 2 for our schedule to obtain the requested information.

b. The feedwater isolation signal is generated by a reactor trip and safety injection signal. No manual actions were assumed for feedwater isolation.

Question 11 - Page 11, item 14, Main Steam Header Pressure Transmitters

TVA says that they may fail but gives no corrective measures or mitigative actions. Elaborate on this failure.

Response

The transmitters and associated cables have been insulated with a thermal blanket to prevent them from exceeding their qualification temperature during the course of this event. The thermal blanket analysis is given in enclosure 2 to the referenced letter.

Question 12

What is the effect on the core integrity of the blowdown failure of two valves in the main steam valve vault such as the main steam power-operated relief valves (PORVs), bypass valves, and blowdown valves.

Response

Core integrity will not be adversely affected by the blowdown failure of two or more valves in the WBN main steam valve vault. The overcooling and power transients expected to occur from multiple failures of this type will not be as severe as predicted by a large MSLB analysis for the similar Sequoyah Nuclear Plant (SQN). The large break SQN MSLB analysis assumed a 4.6 ft^2 break without a boron injection tank for mitigation of the event. Flow restrictions in the steam generator nozzles at WBN limit the blowdown area of each steam generator to 1.4 ft^2. The total blowdown area of a single steam generator and two stuck-open PORVs at WBN is 1.6 ft^2. Therefore, postulated multiple steam generator-valve blowdowns for WBN will be bounded by the blowdowns determined in the SQN MSLB analysis, and the overcooling and subsequent power transient effects will not be as severe. Since the SQN MSLB analysis demonstrates acceptable results and since the WBN multiple steam generator blowdown is bounded by the SQN analysis, it is concluded that multiple steam generator blowdowns at WBN do not adversely affect core integrity.